## REMARKS

Claim 30 has been canceled herein.

Claims 16-27 and 34 [and 35] stand rejected under 35 USC 103 as being unpatentable over Hung (6339925) in view of Pfefferle (6048194). Claims 28-29 and 31-33 stand rejected under 35 USC 103 as being unpatentable over Hung (6339925) in view of Pfefferle (6048194) in view of McCarty (6015285).

*Response to 35 USC 103 Rejections*

Applicant appreciates Examiner's clear explanation of the prior art. Applicant has amended the claims to increase clarity in general, and to distinguish over the prior art. Amendments to the claims are supported at least by paragraphs 24 and 25, and the figures of the originally filed substitute specification. In amended claim 16 Applicant now claims:

> providing a catalytic burner *comprising a first catalytic element disposed in a first flow path*, the first flow path in fluid communication with and disposed upstream with respect to a direction of flow within a primary burner, the primary burner comprising a flow channel.

The only catalytic element in Hung is element 25, which is disposed at a downstream end of catalytic burner 20, and is taught to specifically be adjacent the downstream end. (Column 2, line 50).

Applicant further claims:

> reacting fuel supplied by a burner fuel supply in a catalytic pre-reaction by exposing the fuel to the catalytic element.

and

> directing the pre-reacted fuel from the first flow path into the flow channel *at a location radially offset from* and at an angle of 15° to 75° relative to *a flow channel longitudinal axis*, wherein the *flow channel outer wall* is effective to impart a circumferential motion to the pre-reacted fuel in the flow channel

Hung/Pfefferle does not teach directing the pre-reacted fuel into the flow channel at a location radially offset from a flow channel longitudinal axis, or wherein the flow channel outer wall, (as opposed to a swirler) imparts circumferential motion to the pre-reacted fuel. Applicant

respectfully requests the 35 USC 103 rejection of claim 16, and dependent claims 17-23 be withdrawn.

Regarding claim 18, Hung specifically requires the catalytic element be adjacent the downstream end of the catalytic burner. In order to have a dwell time, the Hung catalytic element must either be moved upstream, or the casing 22 of the catalytic burner be extended further downstream. In both cases the catalytic element 25 would no longer be adjacent the downstream end of casing 22. Since Hung specifically requires the catalytic element 25 be adjacent the downstream end of the casing 22, the proposed modification would change the principal of operation of Hung, which is impermissible per MPEP 2143. Applicant respectfully requests the 35 USC 103 rejection of claim 18, and dependent claims 19-23 be withdrawn.

In amended claim 24 Applicant now claims:

> a catalytic burner comprising a *catalytically effective element disposed in a catalytic burner flow channel*, the catalytic burner flow channel *arranged to direct pre-reacted fuel into the primary flow channel* via a catalytic burner fuel outlet disposed at a location *radially offset from a primary flow channel* longitudinal axis and at an angle between 15° to 75° relative to the primary flow channel longitudinal axis, *wherein a primary flow channel outer wall imparts circumferential motion to the pre-reacted fuel.*

The arguments presented above apply similarly to distinguish claim 24 from Hung/Pfeffele. Applicant respectfully requests the 35 USC 103 rejection of claim 24, and dependent claims 25-27 be withdrawn.

In amended claim 34 Applicant claims:

> a primary burner having a *first annular flow channel* comprising a first annular outlet *and a second annular flow channel* concentric with and surrounded by the first annular flow channel and comprising a second annular outlet, wherein the first and second annular flow channels comprise a common longitudinal axis;
>
> and
>
> a first catalytic burner comprising: a first catalytic burner flow channel; *a first catalytically effective element* disposed in the first catalytic burner flow channel;

> and a first outlet arranged to direct a first flow into the first annular flow channel, the first fuel outlet *disposed at a location radially offset from* and inclined at an angle between 15° and 75° relative to *the common longitudinal axis*, a first *annular* flow channel outer wall effective to impart circumferential motion to the first flow and create a vortex in the first annular flow channel, wherein the first fuel is catalytically pre-reacted by exposure to the first catalytically effective element

Applicant also claims a second catalytic burner with similar limitations as the first.

The arguments presented above also apply to distinguish claim 34 from Hung/Pfefferle. Hung/Pfefferle appears to teach or suggest only a single annular flow path between elements 22 and 16, while Applicant claims two annular flow channels, and two catalytic burners each with catalytically effective elements, which Hung/Pfefferle does not teach or suggest. Applicant respectfully requests the 35 USC 103 rejection of claim 34, and dependent claim 35, be withdrawn.

Claim 28 depends from claim 16 and relies on the underlying Hung/Pfefferle rejection of claim 16. McCarty does not teach or suggest that which Hung/Pfefferly does not teach or suggest in claim 16. Therefore claim 16 survives Hung/Pfefferle/McCarty. Claim 28 must necessarily survive as well. Applicant respectfully requests the 35 USC 103 rejection of claim 28, and dependent claims 29, and 31-33 be withdrawn.

Regarding claim 32, as asserted above, Hung cannot be modified such that the catalytic element is moved from being adjacent to the downstream end in order to create a dwell time, since Hung specifically teaches the element be adjacent the downstream end. To do so would change the principle of operation of Hung, which is impermissible per MPEP 2143? Applicant respectfully requests the 35 USC 103 rejection of claim 32 be withdrawn.

## Conclusion

Applicants respectfully request that the Examiner reconsider the rejections and timely pass the application to allowance. All correspondence should continue to be directed to our below-listed address. Please grant any extensions of time required to enter this paper. The

commissioner is hereby authorized to charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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By: Janet D. Hood

Janet D. Hood
Registration No. 61,142
(407) 736-4234

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, New Jersey 08830